heap as a breeding centre, and that they may travel as far as 1,408 yards from the place of liberation.

Mr. E. E. Austin contributes the second memorandum on the species of flies present at Postwick; the great majority consisted of the common house-fly. The part played by flies in the dispersal of the eggs of parasitic worms is the subject of the third report, by Dr. William Nicoll. Many experiments were performed, and it is shown that the ova of several worms may be conveyed by flies, the ova in some cases being ingested, in others merely sticking to the surface of the body. Those adhering to the body are generally got rid of within a short time, but when ingested they may remain for two days or more in the intestine. The habit of flies of feeding in turn on excrementitious material and on human foodstuffs obviously suggests that house-flies may play a part in the dissemination of infection of parasitic worms. Dr. Graham-Smith describes further observations on the distribution of bacterial infections by house-flies and blow-flies. It is definitely shown that both are capable of infecting fluids, such as milk and syrup, on which they feed and into which they fall. With house-flies gross infection may be produced for at least three days, and a smaller degree of infection for ten days or more. Blow-flies may carry the infection longer—up to three or four weeks.

The reports, in addition to the observations recorded, contain summaries of previous work on the subjects with which they deal, and form valuable contributions. R. T. H.

NOTES.

CONSIDERABLE progress has now been made with the arrangements in connection with the forthcoming meeting of the British Association at Portsmouth. Suitable meeting rooms have been found for nearly all the sections within about seven minutes' walk of the reception room. The programme of entertainments and excursions promises to be very attractive, and includes a naval display at Whale Island, steamer trips and coach drives in the Isle of Wight and in the South Downs, where visits will be made to Arundel Castle, Goodwood House, West Dean Park, and Parham Park. The following corresponding members and foreign representatives have announced their intention to attend the meeting:—Prof. Cleveland Abbe, U.S. Weather Bureau, Washington; Prof. Carl Barus, Brown University, Providence R.I., U.S.A.; M. A. Gobert, Brussels; Prof. A. A. Michelson, The University, Chicago, U.S.A.; Prof. W. Ostwald, Leipzig; Prof. Otto Pettersson, Stockholm; Prof. F. W. Clarke, U.S. Geological Survey, Washington; Prof. W. J. Humphreys, Mount Weather, Va.; Prof. H. Freundlich, Leipzig; Prof. Albin Haller, Paris; Prof. E. J. Cohen, Utrecht; Prof. R. Wegscheider, Vienna; Prof. Hans von Euler, Stockholm; Prof. P. Zeeman, Amsterdam; Prof. J. W. Spencer, Washington; Prof. Caullery, Paris; Dr. Johan Schmidt, Copenhagen; Dr. P. P. E. Hoek, Haarlem; Prof. H. Jungerson, Copenhagen; M. Chas. Lallemand, Paris; Dr. F. Graebner, Cologne; Prof. H. Webster, Nebraska; Dr. A. Goldenweiser, Columbia University, Missouri; M. A. van Gennep, Seine; Prof. N. Zuntz, Berlin; Prof. Behal, Paris; Prof. H. J. Hamburger, Gröningen; Prof. H. C. Cowles; and Prof. A. A. Noyes.

THE drought and excessive temperature of the present summer continues with great persistence, and if it had not been for the rains which fell generally over the country during the latter half of June, the season would have been practically rainless. The dry weather has embraced nearly the whole of England, although probably it has been most pronounced in the Midland and south-eastern districts, where the aggregate rainfall so far for the summer is only about 50 per cent. of the average. In Scotland and Ireland occasional rains have fallen, as shallow disturbances have skirted our northern and western coasts on their passage from the Atlantic. At Greenwich the aggregate rainfall since the commencement of July only amounts to 0·32 inch. The absence of cloud has resulted in an abnormal amount of sunshine, and the rays of the sun have been exceptionally fierce, and on at least three occasions this summer the black bulb thermometer at Greenwich has exceeded 161°. In the south-east of England the duration of bright sunshine for the first ten weeks of summer was 668 hours, which is 184 hours more than the average. The shade temperature has exceeded 80° at Greenwich on thirty days between July 1 and August 14, and 90° has been exceeded on five days. The shade temperature of 100° at Greenwich on August 9 is the highest authenticated reading in London since trustworthy records commenced in 1841, and is 3° higher than any previous reading at Greenwich, the previous record being 97·1° on July 15, 1881. There have in all only been three days since 1841 with the temperature above 95°; these were 96·6° on July 22, 1868; 97·1° on July 15, 1881; and 95·1° on August 18, 1893. The temperatures in other parts of London on August 9 were also a record, and the same occurred in many parts of England. A reading of 98° was recorded at Epsom and Canterbury, and at Raunds in the Midlands, 97° at Hillington, and 96° at Marlborough, Fulbeck, and Lincoln. In France and Germany the heat has also continued to be excessive. On Tuesday, August 15, there was a cooler air generally over England, and in London the highest temperature was 75°, which is the lowest day maximum for a month.

MR. C. E. ADAMS, of the Department of Lands, New Zealand, has been appointed astronomical observer at Wellington in succession to Mr. T. King, who has resigned.

MR. T. SOUTHWELL, scientific adviser to the Ceylon Company of Pearl Fishers, Ltd., and Inspector of Pearl Banks, Colombo, has been appointed (by the India Office) Deputy Director of Fisheries, Bengal.

THE council of the Royal Statistical Society of London has awarded a Guy medal in gold to Mr. G. Udny Yule "for his extraordinary services to statistical science, for his valuable contributions to the Transactions of the society, and for the special work done by him in the interests of the society."

THE geological and archæological collections made by the late Rev. E. Maule Cole, all the objects of which are connected with East Yorkshire, have been presented to the Hull Municipal Museum by Lady Philadelphia Cole.

THE appointment of Mr. F. W. Taylor, of Denver, Colorado, as Director of Agriculture in the Philippines, is expected to mark the beginning of the application of scientific methods to the cultivation of land in those islands. Mr. Taylor was professor of horticulture in the University of Nebraska from 1891 to 1893. He superintended the departments of agriculture and horticulture at the expositions at Omaha in 1898, Buffalo in 1901, and St. Louis in 1904. He has lately been occupied as an irrigation engineer.

THE council of the Institution of Civil Engineers has made the following awards in respect of students' papers read during the session 1910–11:—the "James Forrest" medal and a Miller prize to Mr. D. Hay (Birmingham), and Miller prizes to Messrs. D. A. Howell (Bristol), R. Bonner (Bristol), G. F. Walton (London), R. G. Parrott (Manchester), E. E. Farrant (London), A. C. Dean (Man-

chester), H. W. Coales (Birmingham), A. H. Meade (London), A. C. Swales (Leeds), and H. J. F. Gourley (Manchester).

IN connection with the celebration of the tercentenary of the Authorised Version of the Bible (1611–1911), a special exhibition, illustrating the natural history of the Bible, has been arranged on the east side of the central hall in the Natural History Museum, Cromwell Road, London. Printed descriptive labels have been attached to the exhibits, which comprise all the animals, plants, minerals, and precious stones mentioned in the Bible. A guide book to the exhibition has been prepared, and is on sale, price 6*d.* (postage 2*d.*). The exhibition is open to the public free daily.

THE Manchester Microscopical Society has arranged, as in previous winters, to provide through its Extension Section lectures and demonstrations of a popular character on scientific subjects. The lectures are arranged for delivery in and about Manchester. The cost, as a rule, is limited to lecturers' expenses, which in most cases do not exceed a few shillings. The work of lecturing and demonstrating is entirely voluntary and gratuitous on the part of the members of the society, but hire of slides, travelling, and out-of-pocket expenses are charged, and in some cases an additional small fee for the lecture is asked for. The list of lectures includes sixty-five subjects, most of which deal with the biological and geological sciences. Secretaries of societies desirous of including lectures on nature subjects in their syllabus may receive a copy of the lecture list on application to the honorary treasurer and secretary, Mr. R. Howarth, 90 George Street, Cheetham Hill, Manchester.

THE Technical Museum in Vienna, which is nearing completion, was initiated by Austrian manufacturers, with the assistance of the State and of the city of Vienna, to commemorate the sixtieth anniversary of Emperor Francis Joseph's reign. The foundation-stone was laid on June 20, 1909, and the building, which is situated opposite the palace of Schönbrunn, covers an area of more than 20,000 square yards. The museum will demonstrate chronologically the development of industries and crafts, illustrate the technical achievements of the present day, and by periodical exhibitions stimulate and promote future progress. In other words, it is intended as an educational centre to spread a knowledge of science and technology from the point of view of national welfare. Considerable progress has been made in stocking the museum, and several large and valuable State collections have been secured already. The historical sequence in the development of pure and applied science is not yet completely shown in the exhibits available for the museum, and the authorities appeal to men of science, technologists, manufacturers, and craftsmen in all countries to assist them in procuring suitable objects for the museum. Everything pertaining to technical labour will be acceptable, principally tools, machines, apparatus, models, materials, methods of working, finished articles, as well as plans, designs, books, illustrations, and manuscripts. The names of donors will be recorded by inscription on the gifts and in a memorial book. Further particulars can be obtained from the office of the Technical Museum, Vienna, I. Ebendorferstrasse 6.

MR. NOEL BUXTON, M.P., and Mr. J. H. Whitehouse, M.P., have issued a memorandum relating to the formation of an "Inshore Fisheries Parliamentary Committee," which has made certain proposals to the Board of Agriculture and Fisheries apparently with regard to the administration of the Development Fund. It is proposed that a sub-department of the Board, consisting of "Inshore Fishery Commissioners," should be established, and that this body should administer a grant of money for the purposes of local cooperative societies for purchasing boats and gear, and for insurance; credit banks; loans; the circulation of information, such as means of transport and distribution; the cultivation of shell-fish and the provision of foreshore allotments, and the policing of the territorial waters. The prosecution of scientific investigation is not suggested; and since the committee remarks that even the best of the fishery committees "are unable to prevent injury to the spawning beds," it is evident that it passes over the fishery research of the last twenty years. The objects of the memorandum are excellent, but it is quite certain that some of them cannot be carried out economically and efficiently without great familiarity with local conditions and a certain amount of scientific research; and this information, with the organisation for increasing it, already exists in the case of several of the better equipped fisheries committees. There are parts of the coasts of England and Wales where fishery research and regulation have never been adequately developed, and a good deal might be said in favour of applying the proposals of the Parliamentary Committee to these neglected inshore areas; but it is difficult to understand why all the organisation for local investigation and control, built up laboriously during the last twenty years by some of the district committees, should be ignored, and the problem of improvement of the inshore fisheries tackled again in apparently a *de novo* manner.

WE learn from *The Japan Times* that the Imperial Academy of Japan has awarded a medal and testimonial to Dr. Kimura for his discovery of the term in the variation of latitude which is generally known by his name. This is the first award under a benefaction which the Academy owes to the Emperor. As at present understood, the complete expression for the variation of latitude at a station in longitude λ is

$$x \cos \lambda + y \sin \lambda + z,$$

where x and y are the rectangular components of the displacement of the pole on the earth's surface relative to its mean position. The third, or z term, which was discovered by Dr. Kimura and is the subject of the award, is annual in period and independent of the longitude of the station. Dr. Chandler therefore sought to explain it as a result of the mean parallax of the stars observed, but found on examination that not more than one quarter of its amount could be accounted for in this way. The nature of the term points to an apparent and unexplained oscillation of the centre of inertia of the earth with a semi-amplitude of 4 or 5 feet. The addition of two observing stations in the southern hemisphere, one in West Australia and the other in the Argentine, to the six international stations previously established in the northern hemisphere, has corroborated the objective reality of the phenomenon, which still presents, therefore, an extremely interesting problem in geophysics. On the occasion of the presentation to Dr. Kimura a lecture was delivered by Prof. Nagaoka, in which he recounted the circumstances in which the discovery was made. The observations made at Mizusawa, the latitude station in Japan under the charge of Dr. Kimura, were suspected of inaccuracy, but the most careful examination failed to reveal the source of error. Finally, Dr. Kimura was able to prove that the errors were not due to an instrumental or personal source, but arose from a cause affecting all the stations alike. He thus vindicated his accuracy as an observer, and discovered

what appears to be a very remarkable phenomenon at the same time. The circumstances are of a piece with the whole history of our knowledge of the variation of latitude; and this is perhaps natural enough, since it is entirely a question of residual phenomena only revealed by observations of the highest order of accuracy.

IN *The Athenaeum* of August 12 Prof. W. M. Ramsay reports a very interesting and important archæological discovery, which will hereafter throw much light on the religion of Asia Minor. This is the holy place of Men Askaenos at Pisidian Antioch. The site contained no temple, but only a great altar standing in an enclosure surrounded by a massive wall. The shrine has clearly remained in the state in which it was left by the Christians when they destroyed it in the fourth century. No other primæval sanctuary on a mountain top, dedicated to a known god and famous throughout Asia Minor, has ever been discovered. The sacred way with votive reliefs on the rocks, the wall of the precinct covered with votive dedications to Men Askaenos, the church built of materials collected from the shrine, the theatre of the Hellenistic or Roman period, present a combination of interesting archæological remains without parallel in this region; and the shallowness of the soil renders excavation particularly easy. It may be hoped that funds for the excavation of this unique sanctuary will soon be provided, and the work carried on by some of the scholars who have been trained by Prof. Ramsay in archæological research in Asia Minor.

THE third season's investigations, conducted at Avebury by the British Association under the superintendence of Mr. H. St. George Gray, commenced in April last. The results of the work supply further corroboration of the conclusions already arrived at that the "temple" dates from the Neolithic stone period. This is shown by the discovery of two worked red-deer antlers, a finely chipped flint knife, and fragments of prehistoric pottery. This last is formed of a coarse, thick black paste containing grains of various substances introduced to bind and strengthen the ware, such as pieces of burnt bone and tiny bits of charcoal. Its chief interest lies in the fact that it is ornamented on both faces, the impressions of twisted grass, or cord, and finger-nails being clearly defined. This pottery was found about 5½ feet below the surface. At a lower depth, but still below the Roman stratum, another form of vessel was discovered, ornamented in a herring-bone pattern, which was impressed by means of a notched implement of wood, bone, or antler, or by a shell with its natural ribbing. This pottery is identical with specimens found in the West Kennet long barrow, at Peterborough, on the Thames at Mortlake, and in General Pitt-Rivers's excavations at Handley, North Dorset. The date of the Avebury circle seems to be definitely fixed by these discoveries.

THE Hittite Excavations Committee, the honorary treasurer of which is Mr. R. Mond, Coombe Bank, Sevenoaks, has issued an appeal for assistance in archæological research in certain parts of Asia Minor and northern Syria. Much information has already been collected regarding Hittite civilisation by the excavations at Boghaz Keui, the capital of the great Hittite kings in the fourteenth and thirteenth centuries B.C. Numerous clay tablets have been discovered here which will throw welcome light on the relations of the Hittite Empire with Assyria on the east and Palestine, the Ægean, and even Egypt on the west. It is now proposed that excavations shall start on the great mound at Sakje Geuzi, which lies four days' journey eastward from Adana, near Tarsus, and on an ancient route between the east and west by way of Carchemish and the Cilician Gate. Prof. J. Garstang, who will take charge of the operations, has already made some preliminary excavations on this site, and has discovered a palace with sculptured portico which promises to contain most interesting material, possibly that bilingual inscription which would solve the riddle of innumerable documents.

The Scientific American of July 22 contains an appreciative notice, accompanied by a full-page portrait, of Prof. Henry Fairfield Osborn, who, it appears, takes his second name from the Connecticut town in which he was born in 1857. In the course of the article reference is made to the strong support accorded by Mr. Osborn to the tritubercular theory of the evolution of mammalian molars, and likewise to his investigations into the phylogeny of the titanotheres of the American Tertiary.

THE so-called British bird-fauna has just been augmented by another subspecies in the shape of the Alpine ring-ouzel (*Turdus torquatus alpestris*), of which, as recorded by Mr. M. J. Nicoll in *British Birds* for August, a specimen was shot at Guestling, Sussex, on May 23. This race, which ranges from central and southern Europe to the Balkans, differs from the typical form by having more white on the secondary quills, and the presence of large median patches of white on the feathers of the breast and chest, and of white streaks on the under tail-coverts. The more eastern *T. t. orientalis*, which ranges into Egypt, is intermediate in colouring between the typical and Alpine races.

No. 3 of the first volume of the Records of the Canterbury Museum, New Zealand, is devoted to a continuation of the account of the zoological results of the New Zealand Government trawling expedition of 1907, Mr. E. R. Waite dealing with the fishes, Mr. H. Suter with the molluscs, and Mr. C. Chilton with the crustaceans. In a summary of the results of the expedition Mr. Waite directs attention to their bearing on the supply of local food-fishes. One of the results is the marking out of areas suitable for trawling; and although there appears to be no evidence of commercial trawling having in consequence been undertaken on an extended scale, it seems that the favourable report as to the potentialities of the Chatham Islands for line-fishing has been effective in attracting capital to what it is hoped will prove a profitable venture.

WE have received copies of six guides to the Grange Wood Museum at Croydon and its various sections, written by the hon. curator, Mr. E. A. Martin. Unfortunately, at least some of these lack that accuracy and "up-to-dateness" which are of such prime importance in publications of this nature. On the first page of the Guide to the Back-boned Animals we find, for instance, the statement that the Chordata (in its restricted sense) includes the sea-squirts and the lamprey, instead of the sea-squirts and the lancelet. In a reference on the same page to the notochord, the author assumes his readers to possess more knowledge than they are likely to have acquired. On p. 8 the statement that the constituent bones of the chelonian shell articulate by means of teeth is misleading, while on the next page readers are led to believe that chameleons are restricted to N. Africa. The classification of both birds and mammals is quite obsolete; it is stated that there are only two kinds of monotremes, Edentata is misprinted Endentata, and the *horns* of antelopes are referred to as *antlers*. In the Shell Guide Lamellibranchiata is spelt with two m's, and Spondylus is included among gastropods; and, to take one example from the Fossil

Guide, we are told that Dolichosaurus was still in existence in the Chalk, whereas it is only known from that formation.

IN part ii. of the Proceedings of the Zoological Society of London, published in June, Dr. W. N. F. Woodland has published a thesis "On the Structure and Function of the Gas Glands and Retia Mirabilia associated with the Gas Bladder of some Teleostean Fishes." The structure of these bodies is well illustrated by eight coloured plates, and an ingenious hypothesis is advanced to explain the remarkable conformation of the well-known rete mirabile duplex constantly associated with the gas gland (oxygen gland). The general theory put forward to explain the actual mode of production of oxygen by the gland—a very interesting physiological problem—is, we notice, almost entirely based upon the study of stained microscopic preparations, and thus lacks the essential support only to be derived from physiological experiment. The author, however, has recently investigated the physiological aspect of the subject at Plymouth, and has supplied an account of the results obtained in a further paper to be read before Section I at the forthcoming meeting of the British Association at Portsmouth.

PROF. HANS DRIESCH'S essay "Die Biologie als selbständige Grundwissenschaft und das System der Biologie," almost entirely rewritten, has appeared in a second edition (Leipzig: Wilhelm Engelmann, price 1.20 marks). The book is issued as "Ein Beitrag zur Logik der Naturwissenschaften," and is a clear statement of the value of the interaction of philosophy and biology.

THE new volume (xliii., 1 and 2 Heft) of the *Morphologisches Jahrbuch* (Gegenbaur) contains, among other memoirs, a detailed account of the spinal cord of the dugong, by Drs. Dexler and Eger. The simple segmentation of the body of the animal and its adaptation to aquatic life are found to be reflected in the cord, which is almost uniformly segmented, and exhibits no trace of thickening in the lumbar region; there is, however, some shortening in the cervical portion. The form, size, stainability, position, pigment, tigroid substance, nuclei, and processes of the nerve cells do not present any special peculiarities. Dr. Hans Bluntschli describes an abnormal pelvis of a female Java ape (*Macacus cynomolgus*), which exhibits differences from the normal similar to those shown by a human "Naegele pelvis." Dr. K. Ogushi contributes the first instalment—the description of the skeleton—of his account of the anatomy of the Japanese three-clawed turtle (*Trionyx japanicus*).

PROF. RAYMOND PEARL deals in the current number of *Scientia* with biometrical ideas in biology, their significance and limitations. He points out that the real purpose of biometry is the general "quantification" of biology, that the biometrical constants (mean, standard deviation, coefficient of correlation, &c.) are constant characters of the "group" (for instance, a species) as such, and that the shape of the variation curve for the particular group of organisms is a definite character for the group. Biometry furnishes, in fact, a valuable and refined extension of the descriptive method; but it must not be applied loosely; it is necessary to use in its application as much general "biological intelligence" in regard to the significance of the problem attacked, the validity of the assumptions made, and the applicability of the methods to the particular problem as would be exercised in an investigation by any other method.

THE second Heft of vol. xcviii. of the *Zeitschrift für wissenschaftliche Zoologie* comprises three memoirs. Herr Rungius gives a detailed account of the anatomy and histology of the alimentary canal, larval and adult, of the water beetle *Dytiscus marginalis*. Dr. Gustav Fritsch describes the histology of the eye of a fruit bat (Pteropus) from Sumatra. The remarkable point in the structure of the eye is the presence of finger-like processes extending from the choroid into the middle layer of the retina. The author regards these as comparable to the pecten of the eye of birds, and attributes to them a nutritive function and the *rôle* of regulating pressure in the eyeball. Herr Kapzov has investigated the intimate structure of the cuticle of insects, and finds that it has a honeycomb appearance, due partly to variations of pressure during its formation, and partly to varying activity of the hypodermis cells which secrete it.

AMONG the articles in the July issue of *The Popular Science Monthly* is one by Mr. A. H. Thayer on concealing coloration, the writing of which was prompted, in the first instance, by certain statements in Mr. Roosevelt's recent book on African animals. Mr. Thayer holds that it is the rule for animals to be coloured like the background which most concerns their feeding and escaping attack; but the human observer, in order to experience the concealing effect of such marking, must look at the animals from the same level as their normal enemies; in many cases he must look *up* to them from near the level of the ground. The reed and sky markings of zebra and oryx make it difficult to distinguish them, in their usual surroundings, by night as well as by day. Prof. Montgomery advocates the expansion of the usefulness of natural history museums. He holds that they should be centres for instruction in taxonomic work, which can be better undertaken there than in university laboratories. Under such an arrangement, taxonomic collections and courses may well be abolished from universities. He also enters a plea for increased opportunities for research by the staffs of museums.

THE July number of *Tropical Life* is devoted to an account of the rubber exhibition recently held in London. An important feature was the excellent quality and appearance of certain samples of Castilloa, Funtumia, and Ceara rubber. Castilloa rubber from Mexico was shown in block, sheet, and crêpe forms; Funtumia and Ceara were sent from the Gold Coast as "biscuit," as well as in balls. Specimens of Castilloa from Tobago, comparing favourably with sheet Para, received general commendation.

NOTEWORTHY among the numerous diagnoses of new plants, chiefly from tropical Africa and Asia, published in the *Kew Bulletin* (No. 6), are the descriptions of two species of Impatiens from Malaya, communicated by Sir Joseph Hooker; *Impatiens peltata* is distinguished by its peltate leaf, and *I. Vaughanii* bears characteristic sepals. Another important determination is supplied by Dr. O. Stapf of a lawn grass, locally termed blue couch, that has found favour in some coastal districts in New South Wales. The author refers it to *Digitaria didactyla*, specimens of which he has also discovered from Madagascar and Tonkin. It grows more strongly than *Cynodon dactylon*, which is generally employed for lawns in the colony, and is said to possess other advantages.

PROMINENCE is accorded to a contribution by the eminent zoologist Prof. E. Giglio-Tos in the *Botanisches Centralblatt* (July 15), in which it is claimed that the recent experiments with reciprocal hybrids recorded by Prof. de Vries, and briefly noted in these columns (NATURE, April 13), provide striking confirmation of certain laws in

hybridism advanced by the author. According to one of these laws, crosses from reciprocal hybrids show a return to the characters of one of the original species, and these are the only crosses in which hybrid characters are not maintained. Another law states that when crosses are raised from a hybrid and one of the original parents, if a hybrid carrying the male character is crossed with the female parent, or *vice versa*, the hybrid characters are maintained; in the other alternatives there is a return to the characters of the parent.

IT seems reasonable to affirm that primitive or natural woodlands still exist in parts of Scotland, although the question does not admit of definite proof. Interesting evidence, based upon an examination of selected observational areas, is submitted by Mr. C. P. Gordon in the Transactions of the Royal Scottish Arboricultural Society (vol. xxiv., part ii.). He discusses three types of "Urwald," *i.e.* birch, Scots pine, and oak. On the ground of inaccessibility and condition of the trees, the birch woodlands on the shores of Loch Ossian and Loch Laggan, ranging to an elevation of 2000 feet, are considered to be primitive. Antiquity is claimed for the Scots pine forming Locheil Old Forest in Inverness-shire; although the trees have flattened crowns, the quality of the wood is excellent, and surpasses that of any imported Scots pine timber. Again, the shape and development of the oaks on Lochwood Moss in Dumfriesshire suggest that this forest is primitive; epiphytic growth of the common polypody and Usnea is here a striking feature. The article also contains notes on the ground floras observed.

THE example set by the United States in retaining a large tract of country as a sanctuary for wild life has been followed by several other countries, including Canada and Switzerland. Mr. J. S. M. Ward appeals in *The Builder* for August 4 that something similar should be done in England. The growth of towns and of small holdings, and the gradual conversion of England into a "Black Country," are causing the disappearance of the real wild country. Efforts should be made to save sanctuaries near our different towns, a matter which might be taken in hand as an extension of the town-planning movement. Forestry should be encouraged wherever possible; much land in private hands might become sanctuary to all practical purposes. Two or three sanctuaries already exist; Epping, though an accidental one, has been a great success in this direction, and so has the Brent Valley Bird Sanctuary of the Selborne Society. Mention should also be made of the work done by the National Trust and by the Commons and Footpaths Preservation Society. Many of the most beautiful spots in England have been saved by their joint efforts, and there are signs that these bodies intend to extend their work in the direction of the provision of sanctuaries.

THE number of new seedling sugar-canes available for planters is greater at the present time than ever before, and experiments are undertaken by the West Indian Department of Agriculture to serve as a guide to planters in selecting the most promising sorts for cultivation. In order to render the investigations applicable to a wide range of conditions, the location of the different experiment stations is chosen with the view of making each station, so far as possible, representative of the cane-growing district round about it, so that, as a whole, the stations supply a complete survey of the conditions under which sugar-cane is grown in the particular island. The report of the experiments conducted in the Leeward Islands for 1909–10 is now issued as Pamphlet 67 of the West Indian Department.

The Agricultural Journal of the Union of South Africa contains each month papers of scientific and of technical interest by officers of the Department. A report is published in No. 3 of the new volume showing that cotton can be successfully raised in the Cape Province. The cultivation is attracting a good deal of local attention, and the crop is satisfactory in quality; there seems the promise that cotton-growing may become a profitable industry. In No. 4 Dr. Theiler gives an interesting and complete summary of recent work on ticks and the part they play in the propagation of diseases in cattle; the particular diseases dealt with are biliary fever in horses, caused by *Piroplasma equi*; redwater in cattle, caused by *P. bigeminum*; gall sickness, or anaplasmosis, due to *Anaplasma marginale*; fevers, caused by *Piroplasma mutans*, by Spirochætes, and the East Coast fever caused by *P. theileria*; and heartwater.

THE annual report for 1909–10 of the Department of Agriculture, British East Africa, shows an encouraging growth of production and a steady influx of settlers with capital. The climate is very varied, and ranges from temperate to tropical within somewhat narrow distances; in consequence, a considerable variety of crops can be produced. Beans, coffee, maize, and millet have increased enormously in area, and in spite of the growing local demand there is a large balance for export. Rubber has likewise increased in amount, and a still further increase is foreshadowed in the future, as the plantations have not yet reached the tappable stage. Sem Sem is also a valuable and increasing crop. On the other hand, copra and wax have fallen off in value; but the decline in copra is not regarded seriously, because the cocoanut is now put to more economical uses. There is a large and growing export of hides, chiefly ox and goat, while ostrich farming, which has recently been introduced, promises to become an important industry.

MM. CLAUDE, FERRIÉ, and DRIENCOURT give in the *Revue générale des Sciences* for July 30 an account of the experiments made for the determination of longitudes by means of wireless telegraphy between Paris and Brest, a distance of about 600 kilometres, and afterwards between Paris and Bizerta, which are separated by about 1550 kilometres. Diagrams of the instruments and connections are given. In the experiments between Paris and Brest in July, 1910, comparisons by radio-telegraphic and telephonic signals gave the same degree of precision, the mean error being less than 0·01s. In the experiments with Bizerta at the end of 1910 suitable radio-telegraphic signals actuated by a clock at the Paris Observatory were received, so that coincidences could be accurately observed, and the differences between the mean comparisons of the same series were of the order of 0·01s.

IN the *Revue générale des Sciences* for July 30 M. Lallemand, the director of the Levelling Service of France, discusses the most suitable form for an international air-map, and proposes a system of marks to enable the aviator to determine his position. The Permanent Committee for Aërial Navigation of the Ministry of Public Works has adopted 1 : 200,000 as the most suitable scale, each sheet containing 1° of latitude by 1° of longitude; longitudes are to be reckoned from 0° to 360° in an easterly direction from the antimeridian of Greenwich; for the ordinary numbering of the parallels of latitude a continuous numbering from the South to the North Pole is proposed with the view of avoiding the change of sign on passing the equator. For local marks a rectangle containing a dot indicating the position of the place in the map sheet, and the number of

the map sheet would be painted on a house-roof or other suitable surface, and this is considered more practical than giving the name of the place. The projection employed is the same as that of the international 1 : 1,000,000 map.

ACCORDING to the *résumé* of communications made to the Société française de physique on July 7, M. M. Kernbaum has succeeded in showing that the "oxygenation" of water, which two years ago he proved could be obtained by allowing the ultra-violet rays from a mercury lamp to act on the water, can be obtained from sunlight. Since it is the ultra-violet rays which are effective, the action is most marked at high altitudes, but it is large enough to be easily detected at sea-level if the water is in presence of air.

IN a thesis submitted for doctor's degree in mathematical science at Geneva, M. Hermann Streele, of Neuchatel, dealing with the theory of mercurial compensation for pendulums, suggests a new form of pendulum in which the free surface of the mercury is near the middle of the column, the upper part resembling a barometer tube. This form, he claims, enables him to compensate theoretically both the actual changes of temperature and the error due to the want of uniformity of temperature in different parts of the pendulum chamber. He follows Herr Wanach (remembered as one of Prof. Albrecht's longitude observers) in condemning the old approximate formulæ of Lord Grimthorpe and others, but apparently fails to realise the great dependence of makers on "trial and error." He has not completed the theoretical study, as he ignores, for instance, any molecular temperature effect, and from the practical point of view he has omitted any mention of devices for keeping the atmospheric pressure nearly constant. No hint is given of any possible application of "invar" to mercurial pendulums, though its striking success in bimetallic compensation would seem to recommend a trial of this alloy for some part of the pendulum, if not for the actual stalk.

EXTENSIVE schemes of improvement of the docks of the Port of London, forming part of a more extended scheme resolved on some time ago, are now about to be carried out at a cost of four millions of pounds. It is anticipated that when these works are completed, they will be sufficient to meet the needs of the port for several years. The remainder of the proposed improvements will be deferred until the increase of trade renders them necessary. The works now to be put in hand include the construction of a new deep-water dock of sixty-five acres. It is anticipated that this will occupy five years, and the estimated cost is 2,150,000*l*. This dock will be constructed to take vessels of considerably larger size than those which now can find accommodation in the Thames, the depth being 38 feet and length of the lock 800 feet, or 250 feet longer than that of the present Albert lock. The East and West India docks are to have their approach widened to 80 feet, and depth increased to 31 feet, allowing the entrance of vessels up to 9000 tons. The South-west India dock and the London docks are to have new entrances constructed, and to be otherwise made to meet modern requirements. The water in the latter is to be increased so as to make it 4½ feet above Trinity high-water mark by means of a pumping installation.

A CLASSIFIED list of new books and new editions added to Lewis's medical and scientific circulating library, 136 Gower Street, W.C., during April, May, and June, just received from Mr. Lewis, is a useful catalogue of important works published during that period.

OUR ASTRONOMICAL COLUMN.

COMET 1911*b* (KIESS).—Observations of Kiess's comet, made by Mr. Stratton with the Newall telescope on July 22, 25, and 26, showed a head some 3′ in breadth, but without any sharply defined nucleus. Mr. Newall, in No. 4517 of the *Astronomische Nachrichten*, does not give the times of the observations, but states that the comet was visible to the naked eye.

Spectroscopic observations revealed a bright band at λ 516 in which the head was seen to be 5′ or 6′ broad, and the band could also be traced along the tail to a distance of at least 5′; bands were also seen at λλ 474, 516, and 564, and the continuous spectrum was recorded as very faint.

A note appended to the ephemeris given in No. 438 of *The Observatory* directs attention to the fact that on September 3 the earth will pass through the point traversed by the comet on August 7; a careful watch should be kept for cometic débris in the form of meteors.

BROOKS'S COMET, 1911*c*.—New elements and ephemeris for comet 1911*c* are published in No. 4517 of the *Astronomische Nachrichten* by Dr. Ebell. As the new positions, especially for the later dates, show considerable departures from those we reproduced in these columns on August 3, we give the following abstract from the ephemeris :—

Ephemeris (12*h*. *M.T. Berlin*).

1911	α (true) h. m.	δ (true) ° ′	log *r*	log Δ	mag.
Aug. 16 ...	21 22·0 ...	+39 33·5 ...	0·1932 ...	9·8632 ...	8·5
,, 20 ...	21 4·3 .	+43 6·8 ...	0·1747 ...	9·8324 ...	8·3
,, 24 ...	20 41·9 ...	+46 43·8 ...	0·1552 ...	9·8033 ...	8·0

This comet was observed by Mr. Stratton on July 25 and 26, and was found to have a bright nucleus which gave a continuous spectrum; the band at λ 516 in the spectrum could be traced faintly for about 2′ from the nucleus both towards the sun and in the opposite direction. The comet could be seen with a pair of opera glasses.

A large number of observations of position and brightness are recorded in the *Astronomische Nachrichten* (No. 4517) from Greenwich, Utrecht, Algiers, and many other observatories. At Algiers Dr. Gonnessiat found, on July 22, a 4′ or 5′ nebulosity having an eleventh-magnitude nucleus which was not central. Herr G. van Biesbroeck found that the magnitude of the comet seen with opera glasses on July 26, 27, and 29 was about 8·0.

ENCKE'S COMET, 1911*d*.—Dr. Gonnessiat's report of the rediscovery of Encke's comet appears in No. 4517 of the *Astronomische Nachrichten*, and states that the comet was a difficult object in the dawn. Perihelion passage takes place on August 19, and an ephemeris giving positions from August 24 to September 21 appears in No. 438 of *The Observatory*; for August 24 and 28 the positions are 10h. 44·5m., 5° 46′ N., and 11h. 16·1m., 1° 2′ N., respectively.

THE OBSERVATION OF METEORS.—Amateur astronomers not possessing efficient instrumental equipment cannot do better than devote their attention to the observation of meteors, about which students of cosmogony still require to learn many things.

For such observers the publication (*Observatory*, No. 438) of a letter written by the late Prof. Alex. Herschel to Mr. Denning in August, 1876, is full of interest and practical information. Those who had the pleasure of corresponding with Prof. Herschel will understand that it is impossible to describe a letter of his in detail in a confined space, but the amateur will find especially interesting the discussion of "trains." These phenomena are seldom properly described, and Prof. Herschel takes some pains to impress upon his correspondent the great importance and the almost infinite variety of the luminous phenomena attending a meteor flight.

BETA AND GAMMA RAYS IN SOLAR PHENOMENA.—From Dr. A. Brester, Jz., we have received an interesting monograph dealing with the theory that solar phenomena are produced by the solar emission of β and γ rays. Dr. Brester starts with the terrestrial aurora produced by